Assessment: Assessment Unit Four Column

Spring/Summer 2017

El Camino: PLOs (MATH) - Math (GE and Non-Science Majors)

PLOs	*Assessment Method Description*	*Results*	*Actions*
PLO #1 Graphical Methods - Students will be able to analyze and solve application problems involving business, the social sciences, and/or biological sciences using graphical methods. **PLO Status:** Active **PLO Assessment Cycle:** 2016-17 (Spring 2017), 2020-21 (Spring 2021) **Input Date:** 07/01/2013	**Exam/Test/Quiz -** For our CM2 courses (Mathematics for GE and Non-Science Majors), we utilized a variety of test and quiz problems (given below) to assess student mastery of problem solving skills essential for being successful not only in their current coursework but in their future math and major coursework at their transfer institutions. Our ultimate goal is to prepare our students for their major coursework by teaching them how math applies to their field of study. Math 120 (Nature of Mathematics) - Given a number of data points, construct a Venn diagram to answer questions of the number of data points that have a certain property. Math 130 (College Algebra) - Graph a rational function by clearly stating the intercepts, asymptotes, and using any other necessary points. Math 140 (Finite Mathematics for Business and Social Sciences) - Find the maximum and minimum values	**Semester of Current Assessment:** 2016-17 (Spring 2017) **Standard Met:** Standard Met Across all the CM2 courses administered during Spring 2017, we have the following results for PLO #1 (Graphical Methods): Total Students Assessed: 1371 Scoring a '3' – 36% of students (or 494 students) – Demonstrate complete understanding of the problem being assessed. Scoring a '2' – 36% of students (or 491 students) – Demonstrate most understanding of the problem being assessed. Scoring a '1' – 19% of students (or 263 students) – Demonstrate some understanding of the problem being assessed. Scoring a '0' – 9% of students (or 123 students) – Demonstrate no understanding of the problem being assessed. Overall, we have attained a 72% success rate (that is, scoring a 2 or 3 on the assessment). This meets our target for success of 70% or higher. Analysis:	**Action:** We reached our target success rate overall, but the courses, when looked at individually, did not have consistent success rates. We have set a goal to try new teaching strategies to make the success rates more consistent across all the CM2 courses. This is an important goal to achieve because we want our students to experience similar success in any of the math courses for GE and Non-Science Majors that they take. (09/20/2019) **Action Category:** Teaching Strategies **Follow-Up:** Graphical understanding of functions continues to be a topic students struggle with. Instructors have commented on the need to incorporate technology (graphing software and calculators), have students work in groups, and have students verbalize their thought processes. Some instructors for our CM2 courses have

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	(and the values of x and y at which these occur) of a function involving x and y subject to five constraint inequalities. Math 150 (Elementary Probability and Statistics) - Use a contingency table to answer questions about the probabilities of certain events. Then construct a relative frequency bar graph and use it to interpret the differences between certain relative frequencies. Math 165 (Calculus for the Biological, Management and Social Sciences) - Given an exponential decay function, evaluate an improper integral whose integrand is the given function over a given time period. Then, graph the function and shade the portion of the graph that represents the improper integral. **Standard and Rubric:** Across our CM2 courses, we establish a goal of at least 70% of our students enrolled in the GE and Non-Science Majors mathematics coursework to score a '2' or a '3' on the SLO assessments. This would mean at least 70% of our students will attain most to complete understanding of the problem solving involved. We utilize the following general rubric across the SLO assessments: Score of 3 (Complete Understanding) - Student demonstrates mastery of the problem being presented.	Overall, the CM2 courses mostly reached this target success rate individually, but some courses have higher success rates than others. We can try to make the success rates more even across the courses as well as improve the PLO success rates, To reach these goals, instructors across our CM2 courses have commented on many methods that are helping students learn the concepts quickly as well as methods that they can try to help improve student success. Here are some methods that instructors feel are helping students learn the material better in class. 1. Provide similar problems on study sheets. 2. Go over Powerpoint examples in class and point them online for students to review. 3. Use a combination of going over things by hand and using the graphing calculator to solve problems. 4. Using student instructors (SI coaches) for peer help. 5. Tie the problems into real-world applications in business and biology. Here are some suggestions from instructors on how we can improve student success in CM2 courses. 1. Provide more of a variety of questions from my own sources and not rely solely on the textbook and the associated MyMathLab questions. 2. Give students more time to digest the material before testing them on it. 3. Require stronger prerequisite courses for Math 140. 4. Create activities with similar wordings to train students to pay attention to every word in each question. 5. Bring in charts from real-world materials like journals and ask students to interpret the charts in their own words. 6. Make videos to help teach the material to students so they can watch them when they need review. (09/20/2017) **Faculty Assessment Leader:** Jasmine Ng **Faculty Contributing to Assessment:** Megan Granich, Linda Ho, Jill Evensizer, Benjamin Mitchell, Diaa Eldanaf, Zachary Marks	commented that students continue to either omit graphical problems or answer them incorrectly. For future assessments, instructors have mentioned we should increase the graphical / qualitative skills covered in our courses to help improve performance. (10/14/2019)

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	Problem solving techniques and strategies are well thought out and clearly presented. Student can clearly utilize the concepts of the course to solve application problems in a variety of areas. Score of 2 (Most Understanding) - Student demonstrates most understanding of the problem and problem solving techniques involved. With the exception of some computational errors, the student demonstrates strong conceptual understanding and how to apply appropriate problem solving strategy. Score of 1 (Some Understanding) - While some understanding of the concepts and problem solving being assessed is evident, there are significant gaps. Conceptual and procedural errors in problem solving and/or logic are evident. Score of 0 (No understanding) - Student demonstrates very little to no understanding of the problem solving strategies and/or techniques used to solve the assessed problem.	**Courses Associated with PLO Assessment:** Math 120, Math 130, Math 140, Math 150, Math 165	

Assessment: Assessment Unit Four Column

Spring/Summer 2017

El Camino: PLOs (MATH) - Math (Prospective Elementary School Teachers)

PLOs	*Assessment Method Description*	*Results*	*Actions*
PLO #1 Solving Application Problems - Students will be able to determine an appropriate strategy to solve an application problem, complete the solution of the problem, describe the procedures used to solve the problem, and explain the underlying mathematical concepts using written and oral means. **PLO Status:** Active **PLO Assessment Cycle:** 2013-14 (Spring 2014), 2014-15 (Spring 2015), 2015-16 (Spring 2016), 2016-17 (Spring 2017), 2017-18 (Spring 2018) **Input Date:** 07/01/2013	**Multiple Assessments -** To assess this SLO, faculty teaching Math 110, Math 115, and Math 116 will use tests, quizzes, class activities, projects, homework, and writing assignments to determine the level of success students' have reached regarding this PLO. **Standard and Rubric:** The following rubric will be used to assess this PLO. Score of 4: Students demonstrate a keen understanding of setting up and solving application problems. Students are able to solve the application problems with no errors. Students are able to provide an exemplary explanation of the mathematical concepts for the application problems. Score of 3: Students demonstrate a good understanding of setting up and solving application problems. Students are able to solve the application with minor errors. Students are able to provide a good	**Semester of Current Assessment:** 2017-18 (Spring 2018) **Standard Met:** Standard Met RESULTS Math 110, Math 115, Math 116 Mean = 3.01 Standard Deviation = 0.61 Pearson Correlation Coefficient: -0.22 Correlation Conclusion: There is no correlation between number of absences and PLO #1. Average Number of Absences: 3.22 Sample Size: 79 Math 110 Only Mean = 3.02 Standard Deviation = 0.61 Pearson Correlation Coefficient: -0.25 Correlation Conclusion: There is no correlation between number of absences and PLO #1. Average Number of Absences: 3.04 Sample Size: 52 Math 115 and Math 116 Only Mean = 3.00 Standard Deviation = 0.62 Pearson Correlation Coefficient: -0.16 Correlation Conclusion: There is no correlation between number of absences and PLO #1. Average Number of Absences: 3.56 Sample Size: 27	**Action:** Instructors in the Math for Teachers program will continue to emphasize the importance of class attendance. We will continue to model and explore different problem solving strategies in our classrooms and give students opportunities to work with their peers on implementing these strategies on a variety of application problems. (09/05/2019) **Action Category:** Teaching Strategies **Follow-Up:** The importance of attending each class session is emphasized by every instructor. Students continue to have the opportunity in class to work with their peers on different problem solving strategies. (09/13/2019)

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	explanation of the mathematical concepts for the application problems. Score of 2: Students demonstrate a fair understanding of setting up and solving application problems. Students are able to solve the application problems with several errors. Students are able to provide some information about the mathematical concepts for the application problems. Score of 1: Students are unable to demonstrate set up and solve application problems. Students are not able to solve the application problems or they are able to solve the application problems with significant errors. Students are not able to provide an explanation of the mathematical concepts for the application problems. CORRELATION BETWEEN THE NUMBER OF ABSENCES AND THE SUM OF THE SCORES FOR THE 3 PLOS To determine if there is a positive correlation, negative correlation, or no correlation, the Pearson Correlation Coefficient was used. The Pearson Correlation Coefficient represents the slope of the Best Fit	At least 70% of the students in Math 110, 115 and 116 have reached the benchmark of a score of 3 or higher. The mean and standard deviation for PLO #1 have remained consistent over the past few years, with a mean score above 3.00 each year. Students are able to successfully select an appropriate strategy to solve application problems, determine the reasonableness of their answers, and communicate their strategies and solutions in written and oral form. The mean score did decrease by 0.27 compared to the mean score for PLO #1 in 2016 and 2017. The average number of absences did increase to 3.22 as compared to the 1.82 average number of absences in 2017 and 2.57 in 2016. This increase in the average number of absences may have resulted in a lower mean score for this PLO. Although the Pearson Correlation Coefficient showed no statistical correlation between the number of absences and students score on PLO #1, we contend as instructors that students who miss class have less opportunities to discuss and explore mathematical concepts with their peers. (09/05/2018) **Faculty Assessment Leader:** Susanne Bucher **Faculty Contributing to Assessment:** Susanne Bucher, Susie Tummers, James Yang **Courses Associated with PLO Assessment:** Math 110, 115 and 116 **Semester of Current Assessment:** 2016-17 (Spring 2017) **Standard Met:** Standard Met RESULTS Math 110, Math 115, Math 116 Mean = 3.28 Standard Deviation = 0.65 Pearson Correlation Coefficient: -.164 Correlation Conclusion: There is no correlation between number of absences and PLO #1. Average Number of Absences: 1.82 Sample Size: 72 Math 110 Only	**Action:** We will continue to emphasize the important components of solving application problems, which are carefully selecting an appropriate strategy, predict the potential answer to the problem and check if their answers are reasonable in the context of the problem, and articulate the strategy that was used, the answer to the problem, and why the solution is

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	Line representing the data. The following scale is used to determine correlation. Pearson Correlation Coefficient = 1.0 [Perfect Positive Correlation] Pearson Correlation Coefficient between 0.7 and 1.0 [Acceptable Positive Correlation] Pearson Correlation Coefficient between 0.7 and -0.7 [No Correlation] Pearson Correlation Coefficient between -0.7 and -1.0 [Acceptable Negative Correlation] Pearson Correlation Coefficient = -1.0 [Perfect Negative Correlation] TARGET FOR SUCCESS The Math for Teachers Committee has determined that 70% of students attaining a rubric score of 3 as the target of success.	Mean = 3.36 Standard Deviation = 0.62 Pearson Correlation Coefficient: .04 Correlation Conclusion: There is no correlation between number of absences and PLO #1. Average Number of Absences: 1.80 Sample Size: 52 Math 115 and Math 116 Only Mean = 3.05 Standard Deviation = 0.64 Pearson Correlation Coefficient: -.42 Correlation Conclusion: There is no correlation between number of absences and PLO #1. Average Number of Absences: 1.87 Sample Size: 20 At least 70% of the students in Math 110, 115, and 116 have reached the benchmark of a score of 3 or higher. The mean and standard deviation for PLO #1 have remained consistent over time. Students are able to successfully select an appropriate strategy to solve application problems, determine the reasonableness of their answers, and communication their strategies and solutions in written and oral means. In addition, the average number of absences for students enrolled in Math 110, Math 115, and Math 116 has decreased as compared to the students in these courses during the Spring 2016 semester. We acknowledge that even though the data is limited, we continue to be encouraged with this trend and will examine this trend over time. (08/25/2017) **Faculty Assessment Leader:** Judy Kasabian **Faculty Contributing to Assessment:** Susie Tummers, Judy Kasabian, Susanne Bucher **Courses Associated with PLO Assessment:** Math 110, Math 115, Math 116	reasonable and makes sense in the context of the problem. We content that the more practice students have in this endeavor, the stronger their performance will be on this learning outcome. (08/25/2018) **Action Category:** Teaching Strategies **Follow-Up:** Instructors in the Math for Teachers program use activities and group work during class time to allow students the opportunity to explore, practice and discuss different problem solving strategies. (09/05/2018)
		Semester of Current Assessment: 2013-14 (Spring 2014) **Standard Met:** Standard Met DATA	**Action:** We plan to examine how attendance impacts student

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		The data for this PLO is reported below. Math 110, 115, and Math 116 (99 students) 26 (26%) scored a 4 59 (59%) scored a 3 13 (13%) scored a 2 1 (2%) scored a 1 86% of the students completing Math 110, 115, and 116 scored a 3 or 4. Standard was met. Math 110 Only (43 students) 9 (21%) scored a 4 31 (72%) scored a 3 3 (7%) scored a 2 0 (0%) scored a 1 93% of the students completing Math 110 scored a 3 or 4. Standard was met. Math 115 and 116 (56 students) 17 (30%) scored a 4 28 (50%) scored a 3 10 (18%) scored a 2 1 (2%) scored a 1 80% of the students completing Math 115 and 116 scored a 3 or 4. Standard was met. ANALYSIS The data indicates that students completing Math 110, Math 115, or Math 116 are able understand application problems by demonstrating their ability to select an appropriate strategy to set up and solve the problem. Since application problems are common in many mathematics courses, Math 110, Math 115, and Math 116 students have experience with these sorts of problems in varying degrees of success and are able to reach the anticipated standard of success. Even though students have reached the standard of success, we notice that if students do not regularly attend class, there are obvious gaps in their understanding of the mathematics topics being investigated, limited	performance on each of the three PLOs. We contend that if students are not in class, they not only miss mathematics content, but more importantly miss the opportunity to explore and investigate the underpinnings of a mathematical idea, discuss how think and reason mathematically, discover the connections within mathematics and between mathematics and other disciplines, and explain the concepts in their own words. We plan to examine the correlation between student attendance and their rubric score for each of the PLOs. We will collect this data at the end of the semester and report the findings on the next cycle of PLO assessment. (05/15/2015) **Action Category:** SLO/PLO Assessment Process **Follow-Up:** During the spring 2015 semester, we examined the correlation between the number of student absences and achievement on PLO #1. We combined the scores for PLO #1, PLO #2, and PLO #3 to produce a SUM of PLO Scores. We then looked at three groups and computed the Pearson Correlation Coefficient to determine if there is any correlation between the number of student absences and assessment of the PLOs. We compiled the data for three

PLOs	Assessment Method Description	Results	Actions
		experience probing mathematical ideas through inquiry activities, and little time to discuss mathematical ideas with their peers and instructor. (04/24/2014) **Faculty Assessment Leader:** Judy Kasabian **Faculty Contributing to Assessment:** Susanne Bucher, Judy Kasabian, Trudy Meyer, Susie Tummers **Courses Associated with PLO Assessment:** Math 110, Math 115, Math 116	groups and the data and implications are listed below. Math 110, Math 115, and Math 116: Pearson Correlation Coefficient = -.23 which indicates no correlation. Math 110 only: The Pearson Correlation Coefficient = -.30 which indicates that there is no correlation. Math 115 and Math 116 only: The Pearson Correlation Coefficient = -21 which indicates that there is no correlation. Even though the Spring 2015 semester did not reveal any correlation between absences and achievement on PLOs, we plan to continue to examine this idea in future semesters. (04/30/2015)
	Multiple Assessments - To determine the score (using the scoring rubric) for each student in Math 110, Math 115, and Math 115, instructors use tests, quizzes, projects, group work, group discussions, and activities. **Standard and Rubric:** RUBRIC FOR ASSESSMENT Score of 4: • Students demonstrate a keen understanding of setting up and solving application problems. • Students are able to solve the application problems with no errors.	**Semester of Current Assessment:** 2015-16 (Spring 2016) **Standard Met:** Standard Met RESULTS Math 110, Math 115, Math 116 Mean = 3.28 Standard Deviation = 0.71 Pearson Correlation Coefficient: -.26 Correlation Conclusion: There is no correlation between number of absences and SLO #1. Average Number of Absences: 2.57 Sample Size: 92 Math 110 Only Mean = 3.27 Standard Deviation = 0.72 Pearson Correlation Coefficient: -.20	**Action:** We will continue to emphasize the important components of solving application problems, which are carefully selecting an appropriate strategy, predict the potential answer to the problem and check if their answers are reasonable in the context of the problem, and articulate the strategy that was used, the answer to the problem, and why the solution is reasonable and makes sense in the context of the problem. We content that the more practice

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	• Students are able to provide an exemplary explanation of the mathematical concepts for the application problems. Score of 3: • Students demonstrate a good understanding of setting up and solving application problems. • Students are able to solve the application with minor errors. • Students are able to provide a good explanation of the mathematical concepts for the application problems. Score of 2: • Students demonstrate a fair understanding of setting up and solving application problems. • Students are able to solve the application problems with several errors. • Students are able to provide some information about the mathematical concepts for the application problems. Score of 1: • Students are unable to demonstrate set up and solve application problems. • Students are not able to solve the application problems or they are able to solve the application problems with significant errors. • Students are not able to provide an explanation of the mathematical concepts for the application problems. The Standard for Success is 70% attainment.	Correlation Conclusion: There is no correlation between number of absences and SLO #1. Average Number of Absences: 2.55 Sample Size: 55 Math 115 and Math 116 Only Mean = 3.31 Standard Deviation = 0.70 Pearson Correlation Coefficient: -.35 Correlation Conclusion: There is no correlation between number of absences and SLO #1. Average Number of Absences: 2.51 Sample Size: 37 The mean and standard deviation for PLO #1 have remained consistent over time. Students are able to successfully select an appropriate strategy to solve application problems, determine the reasonableness of their answers, and communication their strategies and solutions in written and oral means. (05/04/2016) **Faculty Assessment Leader:** Judy Kasabian **Faculty Contributing to Assessment:** Judy Kasabian, Susie Tummers, Susanne Bucher **Courses Associated with PLO Assessment:** Math 110, Math 115, Math 116	students have in this endeavor, the stronger their performance will be on this learning outcome. (05/04/2017) **Action Category:** Teaching Strategies **Follow-Up:** Data collected during the Spring 2017 semester for PLO #1 indicates that the target for success has once again been met. (08/25/2017)
		Semester of Current Assessment: 2014-15 (Spring 2015) **Standard Met:** Standard Met For PLO #1, the mean and standard deviation was computed for three groups of students. The data and implications is presented below. For Math 110, Math 115, Math 116: The mean = 3.27 and standard deviation = 0.74 For Math 110 only: The mean = 3.25 and standard deviation = 0.63 For Math 115 and Math 116 only: The mean = 3.31 and standard deviation = 0.58 During faculty discussions about this data, we concluded that the means for the spring 2015 students both as a	**Action:** We did not find any correlation between the number of student absences and performance on PLO #1 for students in taking the Math for Teachers courses during the spring 2015 semester. We plan to continue to look at this data to see how this trend plays out over time. (05/20/2016) **Action Category:** Teaching Strategies **Follow-Up:** The Math for Teachers instructors continue to collect

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		collective group and for the two subgroups was higher than previous semesters. This was great news. (04/30/2015) **Faculty Assessment Leader:** Judy Kasabian **Faculty Contributing to Assessment:** Susanne Bucher, Trudy Meyer, Susie Tummers **Courses Associated with PLO Assessment:** Math 110, Math 115, and Math 116	attendance data each semester to see if there is any correlation between attendance and student performance on SLO/PLO assessments. (09/29/2018) **Action:** We plan to continue to examine if there is any correlation between number of student absences and attainment of PLO #1 in future semesters. (05/20/2016) **Action Category:** Teaching Strategies **Follow-Up:** Data collected during the Spring 2016 semester for PLO #1 indicates that the target for success has once again been met. (05/04/2016)
PLO #2 Explaining Mathematical Concepts - Students will be able to demonstrate and explain mathematical concepts using a variety of methods. **PLO Status:** Active **PLO Assessment Cycle:** 2013-14 (Spring 2014), 2014-15 (Spring 2015), 2015-16 (Spring 2016), 2016-17 (Spring 2017), 2018-19 (Spring 2019) **Input Date:** 07/01/2013	**Multiple Assessments -** To assess this SLO, faculty teaching Math 110, Math 115, and Math 116 will use tests, quizzes, class activities, projects, homework, and writing assignments to determine the level of success students' have reached regarding this PLO. **Standard and Rubric:** The following rubric will be used to assess this PLO. Score of 4: Students demonstrate a keen understanding of a variety of mathematical concepts. Students are able to provide an exemplary explanation of a variety of mathematical concepts in written and oral means.	**Semester of Current Assessment:** 2018-19 (Spring 2019) **Standard Met:** Standard Met Results Math 110, Math 115 & Math 116 Mean: 2.88 Standard Deviation: 0.947 Seventy-nine students were assessed in all three courses and the breakdown is as follows 22 students or 28% scored a 4 35 students or 44% scored a 3 13 students or 17% scored a 2 9 students or 11% scored a 1 72% of the students completing Math 110, 115 and 116 scored a 3 or 4. Standard was met. Math 110 Only Mean: 2.8 Standard Deviation: 1.04 Fifty-five students were assessed and the breakdown is as	**Action:** Instructors will continue to emphasize the importance of explanations in class discussions, projects and assignments, and on a variety of assessments. Instructors will also continue to emphasize the importance of class attendance. Students need to be present in class in order to take advantage of the many in class opportunities for explanation of mathematical concepts. (09/13/2020) **Action Category:** Teaching Strategies

PLOs	Assessment Method Description	Results	Actions
		follows Score of 3: Students demonstrate a good understanding of a variety of mathematical concepts. Students are able to provide a good explanation of a variety of mathematical concepts in written and oral means. Score of 2: Students demonstrate a fair understanding of a variety of mathematical concepts. Students are able to provide fair explanation about a variety of mathematical concepts in written and oral means. Score of 1: Students are unable to demonstrate any understanding of a variety of mathematical concepts. Students are not able to provide an explanation of a variety of mathematical concepts in written and oral means. **Additional Comments:** No additional comments.	16 students or 29% scored a 4 21 students or 38% scored a 3 9 students or 16% scored a 2 9 students or 16% scored a 1 67% of the students completing Math 110 scored a 3 or 4. Standard was not met. Math 115 & Math 116 Only Mean: 3.08 Standard Deviation: 0.654 Twenty-four students were assessed and the breakdown is as follows 6 students or 25% scored a 4 14 students or 58% scored a 3 4 students or 17% scored a 2 0 students scored a 1 83% of the students completing Math 115 and 116 scored a 3 or 4. Standard was met. Analysis The data indicates that as a collective group (Math 110, 115, & 116) students are able to adequately explain mathematical concepts in both oral and written form. If we look only at the results for Math 110 we can see that these students have not yet met the standard of success. Typically courses prior to Math 110 do not focus on having student explain mathematically concepts in depth so often times students taking this entry level course in the math for teacher program will struggle with their explanations. Looking at the data for Math 115 & 116 only we can see that these students have a better handle on their explanations. The majority of students will complete Math 110 first and then take Math 115 and/or 116 which means they have already had some experience explaining mathematical concepts. Also the class size for both 115 and 116 was much smaller than the class sizes of 110 which allowed for more individual attention from the instructor. Due to the smaller class size the instructor for Math 116	

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		used a new approach this semester which included speaking to each student individually, prior to assessments, about what concepts were still unclear to them. From this student feedback, review problems and conceptual understanding discussions were completed prior to the assessment. (09/13/2019) **Faculty Assessment Leader:** Susanne Bucher **Faculty Contributing to Assessment:** Susie Tummers, Jacob Love, Susanne Bucher **Courses Associated with PLO Assessment:** Math 110, 115, 116	
		Semester of Current Assessment: 2013-14 (Spring 2014) **Standard Met:** Standard Not Met DATA The data for this PLO is reported below. Math 110, 115, and Math 116 (99 students) 23 (23%) scored a 4 41 (41%) scored a 3 31 (31%) scored a 2 4 (5%) scored a 1 64% of the students completing Math 110, 115, and 116 scored a 3 or 4. Standard was not met. Math 110 Only (43 students) 7 (16%) scored a 4 19 (44%) scored a 3 17 (40%) scored a 2 0 (0%) scored a 1 60% of the students completing Math 110 scored a 3 or 4. Standard was not met. Math 115 and 116 (56 students) 16 (28%) scored a 4 22 (40%) scored a 3 14 (25%) scored a 2 4 (7%) scored a 1	**Action:** We plan to examine how attendance impacts student performance on each of the three PLOs. We contend that if students are not in class, they not only miss mathematics content, but more importantly miss the opportunity to explore and investigate the underpinnings of a mathematical idea, discuss how think and reason mathematically, discover the connections within mathematics and between mathematics and other disciplines, and explain the concepts in their own words. We plan to examine the correlation between student attendance and their rubric score for each of the PLOs. We will collect this data at the end of the semester and report the findings on the next cycle of PLO assessment. (05/15/2015) **Action Category:** SLO/PLO Assessment Process **Follow-Up:** During the spring 2015

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		68% of the students completing Math 115 and 116 scored a 3 or 4. Standard was not met. ANALYSIS The data indicates that both as a collective and individual groups, Math 110, Math 115, and Math 116 are not able to adequately explain mathematical concepts in written and oral form. Explaining mathematical concepts requires students to have a deeper understanding of mathematical ideas, make connections between mathematical ideas, compare and contrast mathematical attributes, and to delve in mathematics beyond just finding an answer. This task is complex and given the varied mathematical experiences and knowledge levels of students, this PLO will always be challenging. In addition, explaining mathematical concepts is not universally taught in all mathematics classes so their experience with explanations is much more limited than other tasks we ask students to do. In addition, we notice that if students do not regularly attend class, there are obvious gaps in their understanding of the mathematics topics being investigated, limited experience probing mathematical ideas through inquiry activities, and little time to discuss mathematical ideas with their peers and instructor. (04/24/2014) **Faculty Assessment Leader:** Judy Kasabian **Faculty Contributing to Assessment:** Susanne Bucher, Judy Kasabian, Trudy Meyer, Susie Tummers **Courses Associated with PLO Assessment:** Math 110, Math 115, Math 116	semester, we examined the correlation between the number of student absences and achievement on PLO #1. We combined the scores for PLO #1, PLO #2, and PLO #3 to produce a SUM of PLO Scores. We then looked at three groups and computed the Pearson Correlation Coefficient to determine if there is any correlation between the number of student absences and assessment of the PLOs. We compiled the data for three groups and the data and implications are listed below. Math 110, Math 115, and Math 116: Pearson Correlation Coefficient = -.23 which indicates no correlation. Math 110 only: The Pearson Correlation Coefficient = -.30 which indicates that there is no correlation. Math 115 and Math 116 only: The Pearson Correlation Coefficient = -21 which indicates that there is no correlation. Even though the Spring 2015 semester did not reveal any correlation between absences and achievement on PLOs, we plan to continue to examine this idea in future semesters. (04/30/2015)
	Multiple Assessments - To		

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	determine the score (using the scoring rubric) for each student in Math 110, Math 115, and Math116, instructors use tests, quizzes, projects, group work, group discussions, and activities. **Standard and Rubric:** RUBRIC FOR ASSESSMENT Score of 4: • Students demonstrate a keen understanding of a variety of mathematical concepts. • Students are able to provide an exemplary explanation of a variety of mathematical concepts in written and oral means. Score of 3: • Students demonstrate a good understanding of a variety of mathematical concepts. • Students are able to provide a good explanation of a variety of mathematical concepts in written and oral means. Score of 2: • Students demonstrate a fair understanding of a variety of mathematical concepts. • Students are able to provide fair explanation about a variety of mathematical concepts in written and oral means. Score of 1: • Students are unable to demonstrate any understanding of a variety of mathematical concepts. • Students are not able to provide an explanation of a variety of mathematical concepts in written and oral means.	**Semester of Current Assessment:** 2016-17 (Spring 2017) **Standard Met:** Standard Met Math 110, Math 115, Math 116 Mean = 2.94 Standard Deviation = .51 Pearson Correlation Coefficient: -.19 Correlation Conclusion: There is no correlation between number of absences and PLO #2. Average Number of Absences: 1.82 Sample Size: 72 Math 110 Only Mean = 2.94 Standard Deviation = .75 Pearson Correlation Coefficient: -.51 Correlation Conclusion: There is no correlation between number of absences and PLO #2. Average Number of Absences: 1.80 Sample Size: 52 Math 115 and Math 116 Only Mean = 2.99 Standard Deviation = 0..66 Pearson Correlation Coefficient: -.51 Correlation Conclusion: There is no correlation between number of absences and PLO #2. Average Number of Absences: 1.87 Sample Size: 20 At least 70% of the students in Math 110, 115, and 116 have reached the benchmark of a score of 3 or higher. The mean and standard deviation for PLO #2 has returned to the typical performances of Math 115 and Math 116 students which is in contrast with the findings from Spring 2016. The mean and standard deviation results continue to exhibit that asking students to explain concepts in an articulate and complete fashion is still a difficult task for some students. We continue to contend that for future teachers, being able to explain concepts and procedures in a clear fashion is imperative for anyone who plans to become a classroom	**Action:** We continue to contend that explaining mathematical procedures is significantly less difficult than explaining mathematical concepts. When a student can explain a mathematical concept, they show a deeper and more comprehensive understanding of the mathematics and are able to connect mathematical ideas in a logical way. We also contend that for future teachers, it is extremely important that they are competent in explanations of procedures and concepts since this is what will be required of them when they become classroom teachers. We will continue to emphasize the importance of explanations in class discussions, projects and assignments, and on a variety of assessments. In addition, the average number of absences for students enrolled in Math 110, Math 115, and Math 116 has decreased as compared to the students in these courses during the Spring 2016 semester. We acknowledge that even though the data is limited, we continue to be encouraged with this trend and will examine this trend over time. (08/25/2018) **Action Category:** Teaching Strategies **Follow-Up:** Instructors in the Math for Teachers program continue to emphasize the

PLOs	Assessment Method Description	Results	Actions
	CORRELATION BETWEEN THE NUMBER OF ABSENCES AND THE SUM OF THE SCORES FOR THE 3 PLOS To determine if there is a positive correlation, negative correlation, or no correlation, the Pearson Correlation Coefficient was used. The Pearson Correlation Coefficient represents the slope of the Best Fit Line representing the data. The following scale is used to determine correlation. Pearson Correlation Coefficient = 1.0 [Perfect Positive Correlation] Pearson Correlation Coefficient between 0.7 and 1.0 [Acceptable Positive Correlation] Pearson Correlation Coefficient between 0.7 and -0.7 [No Correlation] Pearson Correlation Coefficient between -0.7 and -1.0 [Acceptable Negative Correlation] Pearson Correlation Coefficient = -1.0 [Perfect Negative Correlation] TARGET FOR SUCCESS The Math for Teachers Committee has determined that 70% of students attaining a rubric score of 3 as the target of success.	teacher. (08/25/2017) **Faculty Assessment Leader:** Judy Kasabian **Faculty Contributing to Assessment:** Judy Kasabian, Susie Tummers, Susanne Bucher **Courses Associated with PLO Assessment:** Math 110, Math 115, Math 116 **Semester of Current Assessment:** 2015-16 (Spring 2016) **Standard Met:** Standard Met RESULTS Math 110, Math 115, Math 116 Mean = 2.73 Standard Deviation = 1.24 Pearson Correlation Coefficient: -.24 Correlation Conclusion: There is no correlation between number of absences and SLO #2. Average Number of Absences: 2.57 Sample Size: 92 Math 110 Only Mean = 2.39 Standard Deviation = 1.36 Pearson Correlation Coefficient: -.11 Correlation Conclusion: There is no correlation between number of absences and SLO #2. Average Number of Absences: 2.55 Sample Size: 55 Math 115 and Math 116 Only Mean = 3.25 Standard Deviation = 0.79 Pearson Correlation Coefficient: -.50 Correlation Conclusion: There is no correlation between number of absences and SLO #2. Average Number of Absences: 2.51 Sample Size: 37 The mean for the data for PLO #2 are lower and standard	importance of explanations in class discussions, projects, assignments and assessment. (09/05/2018) **Action:** We continue to contend that explaining mathematical procedures is significantly less difficult than explaining mathematical concepts. When a student can explain a mathematical concept, they show a deeper and more comprehensive understanding of the mathematics and are able to connect mathematical ideas in a logical way. We also contend that for future teachers, it is extremely important that they are competent in explanations of procedures and concepts since this is what will be required of them when they become classroom teachers. We will continue to emphasize the importance of explanations in class discussions, projects and assignments, and on a variety of assessments. (05/04/2017) **Action Category:** Teaching Strategies **Follow-Up:** Data collected during the Spring 2017 semester for PLO #2 indicates that the target for success has once again been met. (08/25/2017)

PLOs	Assessment Method Description	Results	Actions
		deviation higher this semester for all groups of students (Math 110/115/116, Math 110 only, and Math 115/116) than what was been reported in years past. This information indicates that in each of the subgroups, the average rubric score is lower and a higher standard deviation indicates that there is more variance (less consistency) than in previous years. We conclude that some students are able to explain the concepts and procedures of mathematical topics and problems while others still find this task difficult. (05/04/2016) **Faculty Assessment Leader:** Judy Kasabian **Faculty Contributing to Assessment:** Judy Kasabian, Susie Tummers, Susanne Bucher **Courses Associated with PLO Assessment:** Math 110, Math 115, Math 116	
		Semester of Current Assessment: 2014-15 (Spring 2015) **Standard Met:** Standard Met For PLO #2, we looked at the mean and standard deviation for three groups. Math 110, Math 115, and Math 116: Mean = 3.08 and standard deviation = 0.78 Math 110 only: Mean = 3.0 and standard deviation = 0.83 Math 115 and Math 116 only: Mean = 3.17 and standard deviation = 0.65 The means and standard deviations for the entire group of students as well as the subset of students are consistent with past semesters. Overall, students are reaching the target for success. The correlation between the number of student absences and combined PLO scores was computed for three groups. Math 110, Math 115, and Math 116: Pearson Correlation Coefficient = -0.23 which indicates no correlation Math 110 only: Pearson Correlation Coefficient = -0.30 which indicates no correlation Math 115 and Math 116 only: Pearson Correlation Coefficient = -0.21 which indicates no correlation. (04/30/2015)	**Action:** We are still curious the about the correlation between the number of student absences and performance on PLO #2. We plan to continue to look at this data each spring to see if a correlation remains the same or changes over time. (05/20/2016) **Action Category:** Teaching Strategies **Follow-Up:** Data collected during the Spring 2016 semester for PLO #2 indicates that the target for success has once again been met. (05/04/2016)

PLOs	Assessment Method Description	Results	Actions
		Faculty Assessment Leader: Judy Kasabian **Faculty Contributing to Assessment:** Susanne Bucher, Trudy Meyer, Susie Tummers **Courses Associated with PLO Assessment:** Math 110, Math 115, and Math 116	
PLO #3 Analyzing Mathematical Problems and their Solutions - Students will be able to analyze a solution to a mathematics problem, determine the appropriateness of the solution, and if errors are made, explain the misconceptions or errors made and how to solve the problem correctly using written and oral means. **PLO Status:** Active **PLO Assessment Cycle:** 2013-14 (Spring 2014), 2014-15 (Spring 2015), 2015-16 (Spring 2016), 2016-17 (Spring 2017), 2019-20 (Spring 2020) **Input Date:** 07/01/2013	**Multiple Assessments -** To assess this SLO, faculty teaching Math 110, Math 115, and Math 116 will use tests, quizzes, class activities, projects, homework, and writing assignments to determine the level of success students' have reached regarding this PLO. **Standard and Rubric:** The following rubric will be used to assess this PLO. Score of 4: Students demonstrate a keen understanding of the representation of the answers to a variety of problems in written and oral means. Students are able to provide a clear and complete explanation of the appropriateness of answers to problems in written and oral means. Students are able to provide a clear and complete explanation of the misconceptions or errors made in problems using written and oral means. Score of 3: Students demonstrate a good understanding of the representation of the answers to a variety of problems in written and oral means. Students are able to provide a good explanation of the appropriateness of answers to problems in written	**Semester of Current Assessment:** 2013-14 (Spring 2014) **Standard Met:** Standard Met DATA The data for this PLO is reported below. Math 110, 115, and Math 116 (99 students) 26 (26%) scored a 4 47 (47%) scored a 3 25 (25%) scored a 2 1 (2%) scored a 1 73% of the students completing Math 110, 115, and 116 scored a 3 or 4. Standard was met. Math 110 Only (43 students) 8 (19%) scored a 4 22 (51%) scored a 3 13 30%) scored a 2 0 (0%) scored a 1 70% of the students completing Math 110 scored a 3 or 4. Standard was met. Math 115 and 116 (56 students) 18 (32%) scored a 4 25 (45%) scored a 3 12 (21%) scored a 2 1 (2%) scored a 1 77% of the students completing Math 115 and 116 scored a 3 or 4. Standard was met. ANALYSIS The data indicates that students completing Math 110,	**Action:** We plan to examine how attendance impacts student performance on each of the three PLOs. We contend that if students are not in class, they not only miss mathematics content, but more importantly miss the opportunity to explore and investigate the underpinnings of a mathematical idea, discuss how think and reason mathematically, discover the connections within mathematics and between mathematics and other disciplines, and explain the concepts in their own words. We plan to examine the correlation between student attendance and their rubric score for each of the PLOs. We will collect this data at the end of the semester and report the findings on the next cycle of PLO assessment. (05/15/2015) **Action Category:** SLO/PLO Assessment Process **Follow-Up:** During the spring 2015 semester, we examined the correlation between the number of student absences and achievement on PLO #1. We combined the scores for PLO #1, PLO #2, and PLO #3 to produce a SUM of PLO Scores. We then

PLOs	Assessment Method Description	Results	Actions
	and oral means. Students are able to provide a good explanation of the misconceptions or errors made in problems using written and oral means. Score of 2: Students demonstrate a limited understanding of the representation of the answers to a variety of problems in written and oral means. Students are able to provide a limited explanation of the appropriateness of answers to problems in written and oral means. Students are able to provide a limited explanation of the misconceptions or errors made in problems using written and oral means. Score of 1: Students are unable to demonstrate the representation of the answers to a variety of problems in written and oral means. Students are not able to provide an explanation of the appropriateness of an **Additional Comments:** No additional comments.	Math 115, and Math 116 are able to reach the standard of success for this PLO. Asking students to examining the reasonableness of their answer requires students to understand the underlying concepts that serve as the foundation for the problem. Determining what might be an expected answer (e.g. a prediction, hypothesis, or estimation) requires higher order thinking skills and content knowledge make a sound judgment. For prospective teachers, it is essential that they become competent in looking at a solution of the problem, determining the mistakes made, deciphering the misconceptions, and determining an appropriate way to help someone solve the problems correctly. This is what teachers do every day. The students in Math 110, Math 115, and Math 116 have the opportunity to examine mathematics through this lens and it is not an easy task to complete successfully. We have come to know that it takes time and a great deal of practice to make headway on this endeavor. Most other mathematics courses do not focus on this task so our students come to the Math for Teachers Program courses with little or no experience finding errors and deciphering misconceptions in work completed by others. In addition, we notice that if students do not regularly attend class, there are obvious gaps in their understanding of the mathematics topics being investigated, limited experience probing mathematical ideas through inquiry activities, and little time to discuss mathematical ideas with their peers and instructor. (04/24/2014) **Faculty Assessment Leader:** Judy Kasabian **Faculty Contributing to Assessment:** Susanne Bucher, Judy Kasabian, Trudy Meyer, Susie Tummers **Courses Associated with PLO Assessment:** Math 110, Math 115, Math 116	looked at three groups and computed the Pearson Correlation Coefficient to determine if there is any correlation between the number of student absences and assessment of the PLOs. We compiled the data for three groups and the data and implications are listed below. Math 110, Math 115, and Math 116: Pearson Correlation Coefficient = -.23 which indicates no correlation. Math 110 only: The Pearson Correlation Coefficient = -.30 which indicates that there is no correlation. Math 115 and Math 116 only: The Pearson Correlation Coefficient = -21 which indicates that there is no correlation. Even though the Spring 2015 semester did not reveal any correlation between absences and achievement on PLOs, we plan to continue to examine this idea in future semesters. (04/30/2015) **Follow-Up:** Many students are less familiar and experienced analyzing solutions to problems and determining the reasonableness of the answer. Instructors in the Math for Teachers Program devote class time to this endeavor at

PLOs	Assessment Method Description	Results	Actions
			appropriate times during the semester. Our concern is that students who miss class meetings may not spend the time to explore this PLO and may not receive the guidance of the instructor and classmates to be competent in the PLO. We will explore this idea during the spring 2015 semester when we collect data not only about student performance on this PLO but the impact (correlation) of number of absences on PLO performance. (04/08/2015)
	Multiple Assessments - To determine the score (using the scoring rubric) for each student in Math 110, Math 115, and Math 115, instructors use tests, quizzes, projects, group work, group discussions, and activities. **Standard and Rubric:** Score of 4: • Students demonstrate a keen understanding of the representation of the answers to a variety of problems in written and oral means. • Students are able to provide a clear and complete explanation of the appropriateness of answers to problems in written and oral means. • Students are able to provide a clear and complete explanation of the misconceptions or errors made in problems using written and oral means. Score of 3: • Students demonstrate a	**Semester of Current Assessment:** 2016-17 (Spring 2017) **Standard Met:** Standard Met Math 110, Math 115, Math 116 Mean = 2.94 Standard Deviation = 0.51 Pearson Correlation Coefficient: -.05 Correlation Conclusion: There is no correlation between number of absences and PLO #3. Average Number of Absences: 1.82 Sample Size: 72 Math 110 Only Mean = 2.94 Standard Deviation = 0.75 Pearson Correlation Coefficient: -.042 Correlation Conclusion: There is no correlation between number of absences and PLO #3. Average Number of Absences: 1.80 Sample Size: 52 Math 115 and Math 116 Only Mean = 2.90 Standard Deviation = 0.63 Pearson Correlation Coefficient: .10 Correlation Conclusion: There is no correlation between	**Action:** We strongly believe that this learning outcome is challenging for all mathematics students and also a necessary skill for those who plan to be classroom teachers. We will continue to diligently offer students many opportunities, through classroom discussions, projects and activities, and on assessments, to strengthen their skills and knowledge of this learning outcome. We will continue to offer our students challenging problems and sufficient time to practice these skills so that they will be able to utilize these skills in their own classrooms once they become teachers. In addition, the average number of absences for students enrolled in Math 110, Math 115, and Math 116 has decreased as compared to the students in these

PLOs	Assessment Method Description	Results	Actions
	good understanding of the representation of the answers to a variety of problems in written and oral means. • Students are able to provide a good explanation of the appropriateness of answers to problems in written and oral means. • Students are able to provide a good explanation of the misconceptions or errors made in problems using written and oral means. Score of 2: • Students demonstrate a limited understanding of the representation of the answers to a variety of problems in written and oral means. • Students are able to provide a limited explanation of the appropriateness of answers to problems in written and oral means. • Students are able to provide a limited explanation of the misconceptions or errors made in problems using written and oral means. Score of 1: • Students are unable to demonstrate the representation of the answers to a variety of problems in written and oral means. • Students are not able to provide an explanation of the appropriateness of answers to problems in written and oral means. **Additional Comments:** No room in the Standard and Rubric to present	number of absences and PLO #3. Average Number of Absences: 1.87 Sample Size: 20 At least 70% of the students in Math 110, 115, and 116 have reached the benchmark of a score of 3 or higher. Unlike Spring 2016, the mean for Math 115 and Math 116 students is lower than what is typically exhibited. This may be a function of these students or a trend to watch for. Regardless, we will continue to keep a close eye on this data or any trends and examine how we can assist students improve on this PLO. We contend that this important skill for all classroom teachers develops over time and we are pleased to see that students in Math 115 and 116 show stronger performance on this learning outcome. (08/25/2017) **Faculty Assessment Leader:** Judy Kasabian **Faculty Contributing to Assessment:** Judy Kasabian, Susie Tummers, Susanne Bucher **Courses Associated with PLO Assessment:** Math 110, Math 115, Math 116	courses during the Spring 2016 semester. We acknowledge that even though the data is limited, we continue to be encouraged with this trend and will examine this trend over time. (08/25/2018) **Action Category:** Teaching Strategies **Follow-Up:** Instructors in the Math for Teachers program continue to offer students many opportunities, through classroom discussion, projects, activities and assessments to strengthen their ability to analyze a solution and determine the misconception a student may have. (09/05/2018)
		Semester of Current Assessment: 2015-16 (Spring 2016) **Standard Met:** Standard Met RESULTS Math 110, Math 115, Math 116 Mean = 2.82 Standard Deviation = 0.86 Pearson Correlation Coefficient: -.22 Correlation Conclusion: There is no correlation between number of absences and SLO #3. Average Number of Absences: 2.57 Sample Size: 92 Math 110 Only Mean = 2.55 Standard Deviation = 0.82 Pearson Correlation Coefficient: -.04 Correlation Conclusion: There is no correlation between number of absences and SLO #3.	**Action:** We strongly believe that this learning outcome is challenging for all mathematics students and also a necessary skill for those who plan to be classroom teachers. We will continue to diligently offer students many opportunities, through classroom discussions, projects and activities, and on assessments, to strengthen their skills and knowledge of this learning outcome. We will continue to offer our students challenging problems and sufficient time to practice these skills so that they will be able to utilize these skills in their own

PLOs	Assessment Method Description	Results	Actions
	the Standard for Success. The Standard for Success is 70% attainment.	Average Number of Absences: 2.55 Sample Size: 55 Math 115 and Math 116 Only Mean = 3.22 Standard Deviation = 0.75 Pearson Correlation Coefficient: -.44 Correlation Conclusion: There is no correlation between number of absences and SLO #3. Average Number of Absences: 2.51 Sample Size: 37 The mean data for students in Math 115 and 116 are higher than those for Math 110 only students and the entire group of students in Math 110, 115, and 116. We contend that determining the reasonable of answers and examining misconceptions in mathematics problems is a difficult task and are emphasized significantly throughout the Math 110, 115, and 116 sequence. Most students begin this sequence in Math 110 and we except that their level of performance of this PLO will be lower than students who are enrolled in Math 115 and 116 since they have had significantly more practice at this task. We contend that this important skill for all classroom teachers develops over time and we are pleased to see that students in Math 115 and 116 show stronger performance on this learning outcome. (05/04/2016) **Faculty Assessment Leader:** Judy Kasabian **Faculty Contributing to Assessment:** Judy Kasabian, Susie Tummers, Susanne Bucher **Courses Associated with PLO Assessment:** Math 110, Math 115, Math 116	classrooms once they become teachers. (05/04/2017) **Action Category:** Teaching Strategies **Follow-Up:** Data collected during the Spring 2017 semester for PLO #3 indicates that the target for success has once again been met. (08/25/2017)
		Semester of Current Assessment: 2014-15 (Spring 2015) **Standard Met:** Standard Met The mean and standard deviation for PLO #2 was computed and reported in three groups. Math 110, Math 115, Math 116: Mean = 3.09 and standard deviation = 0.78 Math 110 only: Mean = 3.02 and standard deviation = 0.78	**Action:** Even though there was no correlation between the number of student absences and performance on PLO #3, we plan to continue to examine this correlation to see how these findings hold up over time.

PLOs	Assessment Method Description	Results	Actions
		Math 115 and Math 116: Mean = 3.21 and standard deviation = 0.68 Our findings indicate that students, in a collective group and also in the subgroups, did much better in explaining mathematical concepts than students in the Spring 2014 semester. Each group of Math for Teachers students is unique and this group was successful in meeting the target for success. In addition, we examined the correlation between the number of student absences and performance on the PLOs. We combined the scores for PLO #1, PLO #2, and PLO #3. We looked at three groups: Math 110, Math 115, and Math 116: Pearson Correlation Coefficient = -0.23 which indicates no correlation. Math 110 only: Pearson Correlation Coefficient = -0.3 which indicates no correlation. Math 115 and Math 116 only: Pearson Correlation Coefficient = -0.21 which indicates no correlation. (04/30/2015) **Faculty Assessment Leader:** Judy Kasabian **Faculty Contributing to Assessment:** Susanne Bucher, Trudy Meyer, Susie Tummers **Courses Associated with PLO Assessment:** Math 110, Math 115, Math 116	(05/20/2016) **Action Category:** Teaching Strategies **Follow-Up:** Data collected during the Spring 2016 semester for PLO #3 indicates that the target for success has once again been met. (05/04/2016)

Assessment: Assessment Unit Four Column

Spring/Summer 2017

El Camino: PLOs (MATH) - Pre-Engineering

PLOs	*Assessment Method Description*	*Results*	*Actions*
PLO #2 Solving Applied Problems in Engineering - Students will apply principles from mathematics, physics, and chemistry to solve applied problems in engineering. **PLO Status:** Active **PLO Assessment Cycle:** 2014-15 (Spring 2015), 2016-17 (Spring 2017), 2018-19 (Spring 2019) **Input Date:** 07/01/2013	**Exam/Test/Quiz -** On a take home exam, students were directed to draw the shear and bending moment diagrams for a beam shown in a figure provided. Then they are to determine the shear and moment at the middle of the beam. Students who drew incorrect shear and moment diagrams, or wrote nothing, earned a score of 0, corresponding to "no understanding", while students who drew the shear diagram correctly, but not the moment diagram, earned a score of 1, which corresponded to "some understanding". Scores of 0 or 1 corresponded to students being unsuccessful at this SLO. Students in the "most understanding" category completed the problem correctly, but did not label axes and constructed incorrect scales, earned a score of 2. Those students in the "complete understanding" category completed the problem with no errors and earned the maximum score of 3. Scores of 2 and 3 corresponded to students being successful at this SLO.	**Semester of Current Assessment:** 2018-19 (Spring 2019) **Standard Met:** Standard Met The question was given to the class with a 2-week deadline. The following hint was emailed to the class: " The first part of the question (Cognitive Skills) is discussed in chapter 3. The second part (Success) is covered in chapter 1. Please read these chapters first to get an idea about these topics and then answer the question based on your own understanding and experience." Equal weights were given to each part of the question (50% Cognitive Skills, 50% Success). As expected, almost everyone could provide very good examples of how to implement academic success strategies. This is mainly due to the fact that the whole concept and strategies are tangible and easy to understand. On the other hand, what differentiates the students in their overall evaluation is their understanding of Bloom's "Taxonomy of Educational Objectives": Remembering, Understanding, Applying, Analyzing, Evaluating, Creating. The answers are sometimes very general and do not specifically point to a specific category. Overall, the outcome of SLO was satisfactory. I believe that the given hint could lead the students into the right direction, so they had a good understanding of what the question is asking for. To improve the results for upcoming	**Action:** The instructor will direct students to discuss cognitive skills and apply academic success strategies related to the study of Engineering, in pairs during class time. (09/25/2020) **Action Category:** Teaching Strategies

PLOs	Assessment Method Description	Results	Actions
	Standard and Rubric: The target for success was 90%, since Engineering 9 is an advanced course for a Community College, requiring both a Physics and Calculus II prerequisite.	semesters, a more comprehensive discussion on Bloom's "Taxonomy of Educational Objectives could be helpful. From the 3 sections of Engineering 1 that were assessed, no students (0%) earned either a score of 0 or a score of 1. Scores of 0 or 1 correspond to students not being successful, while scores of 2 or 3 correspond to students being successful at this SLO. Out of a total of 58 students, 30 (52%) earned a score of 2 and 28 (48%) earned a score of 3. Thus, 100% of the students (all 58) scored 2 or 3 and therefore were successful at applying at assessing cognitive skills and applying success strategies related to the study of Engineering (09/25/2019) **Faculty Assessment Leader:** Milan Gregorovich **Faculty Contributing to Assessment:** Reza Jafarkhani **Courses Associated with PLO Assessment:** Engineering 9	
		Semester of Current Assessment: 2016-17 (Spring 2017) **Standard Met:** Standard Not Met There were 28 students who were assessed for this SLO. Fifteen of them (53%) scored 3 and 5 (18%) scored 2. Thus, 71% of the students were successful at this SLO. Five (18%) scored 1 and 3 (11%) scored 0. Thus, 29% of the students were unsuccessful at this SLO. This falls below the 90% target success rate. Next time that the course is taught, the instructor will assign, collect, and grade homework related to drawing diagrams and determining distributed forces, shear forces, and moments in beams. ANALYSIS: Most students did well. The students in the "Most understanding" category did the problem correctly, but made easily correctable errors such as not labeling axes sufficiently or drawing the diagrams sloppily (not using a straight-edge when appropriate, not using a linear scale on the axes). In several cases they simply did not answer part of the question, even though the information necessary for the answer was evident in their work. (They don't get credit if I have to search for the answer.)	**Action:** Next time that the course is taught, the instructor will assign, collect, and grade homework related to drawing diagrams and determining distributed forces, shear forces, and moments in beams. (09/18/2018) **Action Category:** Teaching Strategies **Follow-Up:** In the Spring 2019 semester, the instructor was encouraged to assign, collect and grade homework related to drawing diagrams and determining distributed forces, shear forces, and moments in beams. (09/25/2019)

PLOs	Assessment Method Description	Results	Actions
		The students in the “Some understanding” category drew the shear diagram correctly, but messed up on the bending moment diagram. The 3 students in the lowest category did not even draw the shear diagram correctly. Even though most students did well on the exam, getting the correct answer, some of them did FAR more work than was necessary. I don’t know if that was because they didn’t understand the shortcuts or didn’t think that I wanted them to use them. It was a take home exam, so they had plenty of time to do the problems the long way. I went out of my way to emphasize and explain the shortcuts and fewer students failed to use them than in previous semesters. The diagrams were sized better than in the past and drawn more neatly. Next semester I will try to collect and grade some homework problems similar to this problem, prior to the exam. There is often a crush near the end of the semester, so even when I collect problems, I am not always able to get them graded before the exam. Also there is not enough time in class for the students to practice working the (long) problems. I plan to try to get this course changed to a 3-unit, 4-hour class to allow an hour of in class problem solving each week. That would help a great deal. [more] (09/18/2017) **Faculty Assessment Leader:** Jill Evensizer **Faculty Contributing to Assessment:** Milan Georgevich **Courses Associated with PLO Assessment:** Engineering 9	
		Semester of Current Assessment: 2014-15 (Spring 2015) **Standard Met:** Standard Not Met Two students (6%) scored 0, exhibiting "no understanding", while 5 students (14%) scored 1, which corresponds to "some understanding". There were 16 students (46%) who scored 2, corresponding to "most understanding", while 12 students (34%) scored 3, which corresponds to "complete understanding". Thus, 80% of the students were successful at this SLO. Though this success rate is fairly high, it did not	**Action:** The next time that Engineering 9 will be taught, the instructor intends on emphasizing short cuts, which will help students in not getting bogged down with doing far more work than is necessary. In addition, the instructor will stress the

PLOs	Assessment Method Description	Results	Actions
		meet the 90% target. Reasons for this are that students were unable to draw appropriate diagrams, did not label properly, and did not use correct scales. (05/21/2015) **Faculty Assessment Leader:** Jill Evensizer **Faculty Contributing to Assessment:** Milan Georgevich **Courses Associated with PLO Assessment:** Engineering 9	importance of drawing neat, properly labeled diagrams, with correct scales. (05/21/2016) **Action Category:** Teaching Strategies **Follow-Up:** This semester the instructor emphasized short cuts but the students still did not meet the standard for success. Next time that the course is taught, the instructor will assign, collect, and grade homework related to drawing diagrams and determining distributed forces, shear forces, and moments in beams. (09/18/2017)